invention as focusing optical elements;

FIG. 9A is a plan view of a projection screen suitable for use in the respective embodiments of the present invention;

FIG. 9B is a front view of the projection screen shown in FIG. 9A;

FIG. 10 illustrates an optical path of stray light generated in the rear projection television according to the present invention;

FIG. 11A schematically shows an image projector using a mirror array composed of a plurality of micro mirrors; and

FIG. 11B is schematic perspective view of a micro mirror shown in FIG. 11A, showing a construction thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A rear projection television according to a first embodiment of the present invention will be described with reference to FIG. 4. In FIG. 4, a projection screen 4 constitutes a front face of a casing 10 of the rear projection television. A projector 1, which uses a focusing optical system including a plurality of aspherical focusing mirrors 5a to 5d, is provided on the side of a bottom plate of the casing 10 and a flat mirror 3 is provided on a lower surface of an upper plate of the casing 10.

A light beam emitted by the projector 1 is directed up to the flat mirror 3 at an angle as high as 45° or more with respect to a normal line of the screen through the

aspherical focusing mirrors 5d, 5c, 5b and 5a. The light beam is reflected to the projection screen 4 by the flat mirror 3 arranged in a plane orthogonal to a plane of the screen 4, so that an image of the light beam emitted by the projector 1 is finally focused on the screen 4.

The present invention is featured by that an optical axis of the light beam projected up to the flat mirror 3 is slanted to the screen 4 to gradually reduce a distance between the optical axis and the screen 4. In other words, the higher the horizontal level of the projected light beam is the smaller the distance between the optical axis of the projected light beam and the screen, as shown in FIG. 4.

Since the plane of the flat mirror 3 intersects the plane of the screen 4 at right angle, the projecting angle of the light beam projected toward the flat mirror 3 becomes equal to the incident angle of the focusing light beam on the screen 4. That is, the present invention is featured by that the depth size of the casing is reduced by arranging the optical system such that the incident angle of light on the screen becomes 45 degrees or more, contrarily to the conventional technical by which the incident angle of light on the screen is restricted. Further, the ghost problem caused by stray light incident on the screen is solved by making the incident angle of light on the screen larger than that in the conventional rear projection television, as to be described later.

In this embodiment, it is preferable that a full

reflection type Fresnel lens 41 having an irregular inside surface shown in an enlarged scale in FIG. 4 is employed as the projection screen 4. More preferably, the screen 4 is a lamination of the Fresnel lens and a lenticular lens.

A rear projection television according to a second embodiment of the present invention will be described with reference to FIG. 5 and FIG. 6. In the second embodiment, an upper wall and a rear wall of a casing 10 are formed by a flat reflection mirror 3 and a flat reflection mirror 2, respectively. With the provision of the rear flat reflection mirror 2, a projector 1 is arranged such that it projects light onto the flat reflection mirror 2 through a focusing optical system including a plurality of aspherical focusing mirrors 5a to 5d.

Furthermore, the projector 1 is arranged such that light beam projected thereby is focused on the screen 4 forming the front side of the casing 10 through the flat mirror 2 and the flat mirror 3 provided on the rear and upper sides of the casing 10, respectively. That is, the flat mirror 2 is arranged such that a plane of the flat mirror 2 on the rear side of the casing 10 is in parallel to a plane of the screen 4 on the front side of the casing 10 and the flat mirror 3 is arranged such that it is orthogonal to the screen 4.

The projector 1 using a liquid crystal panel as the image display element will be described with reference to FIG. 5. The projector 1 is the so-called liquid crystal